CLAIMS

We claim:

1. In an expandable and contractible cellular panel comprised of a plurality of parallel, aligned, elongated tubular sections secured together at the median region of their adjacent longitudinal margins to form the panel, each of the tubular sections being made of flexible sheet material to enable each tubular section to be flattened or expanded into an open tube, the improvement wherein:

adjacent tubular sections of the panel are made of a pair of substantially identical separate strips of sheet material from those forming the other adjacent tubular sections, the various adjacent pairs of strips being laminated together along their confronting longitudinal margins, each strip being made of at least two separate flexible substrate sheets secured together along their longitudinal margins and having different appearances, the corresponding substrate sheets of the strips having corresponding positions in the panel so that all the substrate sheets having one appearance are on one side of the panel and those having a different appearance are on the other side of the panel.

2. An insulating panel for covering windows and the like, the panel comprising a number of elongated tubular sections of sheet material laminated together to provide a panel comprising a plurality of elongated aligned cells, each cell comprising an upper wall portion, a lower wall portion, a front wall portion and a rear wall portion interconnecting front and rear margins of the upper and lower wall portions, the improvement wherein:

the top, bottom, front and rear wall portions of at least each adjacent pair of cells is made of at least two separate elongated strips of sheet material joined together to form the cells, the separate strips forming each adjacent pair of cells being strips different from those forming other adjacent pairs of cells,

each of the elongated strips of material making up the panel being of substantially identical size and construction and comprising at least two flexible substrate sheets secured together along at least one of their confronting longitudinal margins and made of differently appearing material, two of the different substrate sheets of each strip being positioned in the panel to form front and rear sides of a cell and presenting different appearances.

3. The insulating panel of Claim 1 or 2, wherein the substrate sheets of the strips forming the front wall portions of the cells of the panel have a desirable aesthetic appearance and the substrate sheets of each strip that form the rear side of each cell of the panel have an appearance which aids in the reflecting of light impinging on the rear side of the panel from outside the window.

4. The panel of Claim 1 or 2, wherein the substrate sheets of each of the strips are made of a thermoplastic material and are welded together along at least one of their longitudinal margins.

5. The panel of Claim 1 or 2, wherein the strips are laminated together by bands of adhesive.

6. The panel of Claim 4, wherein the secured margins of the substrate sheets of each strip are of a thickness of the order of magnitude of the rest of the sheets so that the adjacent substrate sheets of each strip appear to be a single integral sheet with different appearing bands forming the opposite sides of the panel.

7. The panels of Claim 1 or 2, wherein the tubular sections of the panel provide a vertically expandable and contractible panel.

8. The panel of Claim 1 or 2, wherein each tubular section of the panel is formed by one of the multi-substrate sheets made from only a pair of differently appearing superimposed substrate sheets of substantially identical size, the different substrate sheets of each strip being welded together along their opposite longitudinal margins to form a closed tube.

9. The panel of Claim 1 or 2, wherein each tubular section of the panel is one of the strips including only a pair of the substrate sheets of differently appearing material of the same length and width secured together along only one of the longitudinal margins thereof and initially positioned in a common plane and the opposite longitudinal marginal portions of each strip being folded over the central portion thereof to form an open tube, the open portion of the tube forming each tubular section of the panel is closed by its securement to the central portion of the folded strip of the adjacent tubular section of the panel.

10. The panel of Claim 1 or 2, wherein each strip cut from a web is made of three initially separate substrate sheets connected together along their longitudinal margins and positioned one beside the other in a common

plane, the longitudinal marginal portions of the three-substrate web being folded over the central portion thereof to form an open tubular web, the central substrate sheet of each strip being laminated to the folded over ends of the outer substrate sheets of the adjacent strip.

11. The panel of Claim 10, wherein the outer substrate sheets of each strip are made of a light-passing material, the central substrate sheet is made of an opaque material, and the substrate sheets on one side of the panel being shiftable relative to the substrate sheets on the opposite side thereof, so that the opaque central substrate sheet of each strip can be pivoted between the position where it obstructs light to a maximum degree and a position where it obstructs light to a minimum degree.

12. The panel of Claim 1 or 2, wherein each of the strips is made of three initially separate substrate sheets connected together along their longitudinal margins, the central substrate sheet of each strip being opaque and forming a bottom or top wall portion of a tubular section of the panel, and the outer substrate sheets of each strip being made of a light-transmitting material and forming front and rear wall portions respectively of adjacent tubular sections of the panel, and the substrate sheets on one side of the panel are shiftable relative to the substrate sheets on the opposite sides thereof, so that the opaque central substrate sheet of each strip is pivoted between a position where it obstructs light to a maximum degree and a position where it obstructs light to a minimum degree.

13. The panel of Claim 8, wherein when the panel is oriented so that when the tubular sections extend horizontally and are in vertically-spaced relation, each strip forms a top wall portion, a bottom wall portion, a front wall portion, and a rear wall portion of one of the

tubular sections, the top wall portion being laminated to the bottom wall portion of an adjacent tubular section.

14. The panel of Claim 1, wherein when each tubular section of the panel is oriented so that the tubular sections extend horizontally and are in vertically-spaced relation, the secured together marginal portions of the substrates of each strip are located on the top or bottom wall portion of each tubular section of the panel where they are not visible from the front or rear of the panel.

15. The panel of Claim 14, wherein the secured together marginal portions of the substrates of each strip are laterally offset from each other.

16. The panel of Claim 15, wherein the secured together marginal portions of the substrates form a slight thickening of the strip thereat so that, when the panel is vertically collapsed, the overall height of the collapsed panel is at a minimum because the secured together marginal portions of the substrates of such strip are laterally offset.

17. The panel of Claim 2, wherein the tubular sections of the panel are laminated together by a pair of bands of adhesive spaced on either side of the center line of the top and bottom wall portions of each tubular section of the panel, so that drawstring-receiving holes can be drilled between such spaced bands of adhesive without the adhesive being deposited on the drill bits or other tool used to form the holes.

18. The panel of Claim 14 or 15, wherein the secured together marginal portions of the substrates are secured together by welding the same together and wherein the tubular sections of the panel are laminated together by adhesive which extends over the welded margins of such substrates to reinforce the same.

19. In a method of mass producing insulating panels for covering windows and the like, each panel comprising a number of elongated tubular sections of flexible sheet material laminated together to provide a panel comprising many elongated aligned cells, each of the cells, when extending horizontally and in vertically-spaced expanded relation, being formed by top and bottom wall portions and front and rear wall portions connecting with front and rear margins of the upper and lower wall portions of each cell, the method comprising the steps of:

providing at least two continuous substrate sheets made of differently appearing materials;

securing at least one of the longitudinal margins of the two substrate sheets together to form a continuous multi-substrate sheet web and, where necessary, performing other steps, to form a continuous tubular web;

laminating longitudinally-spaced tubular segments of the web severed or to be severed therefrom to form tubular strips forming the laminated tubular sections of the panel when severed from the web, and severing the segments of the web to form the panel of laminated segments, wherein the front side of the completed panel is comprised only of one of the substrate sheets having the same appearance and the rear side of the panel is comprised only of the other of the substrate sheets having a different appearance.

20. The method of Claim 19, wherein only a pair of the continuous substrate sheets of the different appearing material are used to form the web, the substrate sheets being initially superimposed so that their opposite longitudinal edges are aligned, and the securing step secures together both of the opposite longitudinal edges of the superimposed substrate sheets together to form a flat closed tubular web, then expanding the flat tubular web and then flattening the same in a plane at a substantial angle to the plane of the original flat tubular web, so that the secured-together edges of the substrate sheets of each strip cut from the web will be

located on one of the top or bottom wall portions of a tubular section of the panel when the various strips cut from the web are laminated together and the panel formed thereby is oriented so that the tubular sections thereof extend longitudinally and in vertically-spaced relation.

21. The method of Claim 20, wherein the second plane is less than 90° from the original plane, so that when the flattening step is completed, the welds are laterally spaced on one of the top and bottom wall portions of each tubular section of the panel.

22. The method of Claim 21, wherein the tubular strips are adhesively laminated together over the welds to reinforce the same.

23. The method of Claim 21, wherein the step of flattening the tubular web in a plane less than 90° from that of the original plane of the tubular web includes the steps of transitioning the plane of the original web from an original horizontal plane to an upwardly extending plane and opening the tubular web and then flattening the web to form a horizontally flattened tubular web where the secured together edges are now located on opposite sides of a vertical plane passing through the center of the horizontally flattened web.

24. The method of Claim 19, wherein the securing of the longitudinal margins of the substrate sheets forming each strip is accomplished by superimposing and aligning the corresponding longitudinal margins of the continuous substrate sheets and welding together at least one aligned pair of the longitudinal margins of the superimposed sheets, and there is included the step of at least partially flattening any bulge which results from the welding step.

25. The method of Claim 24, wherein after flattening the welded-together edges of the tubular web, the web is

passed in tension over a heated cambered plate, to minimize longitudinal bow in the tubular strip and ripples at the welded edges of the substrate sheets.

26. The method of Claim 19 wherein the laminated substrate sheets forming the tubular web which form the front and rear sides of the completed panel are made of material of different thicknesses wherein the web is oriented and flattened so that its secured together edge or edges of the tubular web are on the top or bottom of the flattened tubular web which is then fed and guided between at least one pair of pressure-applying nip rollers, one of the rollers being mounted for tilting adjustment in a vertical plane so that the side of the roller to engage the thicker substrate sheet of the web applies a greater pressure to the web than the other side thereof, and so adjusting the tiltably mounted nip roller to apply the greater pressure to the thicker substrate sheet so the web is guided for movement in a straight line.

27. The method of Claim 25 wherein the laminated substrate sheet forming the tubular web which forms the front and rear sides of the completed panel are made of material of different thicknesses wherein the web is oriented and flattened so that its secured together edge or edges of the tubular web are on the top or bottom of the flattened tubular web which is then fed and guided between at least one pair of pressure-applying nip rollers positioned at both ends of the cambered plate, one of the nip rollers at each end of the plate being mounted for tilting adjustment in a vertical plane so that the side of the roller to engage one of the substrate sheets of the web applies a pressure which can be adjusted relative to the pressure applied by the other side of the roller which engages the other substrate sheet, and so adjusting the tiltably mounted nip roller to apply the desired pressures so that the web is guided for movement in a straight line.

28. In a method of mass producing insulating panels for covering windows and the like, each panel comprising a number of elongated tubular sections of flexible sheet material laminated together to provide a panel comprising many elongated aligned cells, each of the elongated cells, when extending horizontally and in vertically-spaced expanded relation, being formed by top and bottom wall portions and front and rear wall portions connecting with front and rear margins of the upper and lower wall portions of each cell, the method comprising the steps of:

providing at least two continuous substrate sheets made of differently appearing materials;

securing at least one of the longitudinal margins of the two continuous substrate sheets together to form a continuous multi-substrate sheet web and performing one or more other steps, if necessary, to orient the multi-substrate sheet web in a flat unfolded condition, where the substrate sheets of the web are in a common plane, then folding the longitudinal marginal portions of the web so that the confronting edges of the folded-over portions of the web do not overlap to form an open tubular web which is then cut into strips and the strips laminated to form the panel.

29. The method of Claim 28, wherein there are only two continuous substrate sheets made of different appearing substrate materials which are secured together to form a two-substrate sheet web, the securing and other steps including superimposing the continuous substrate sheets so that at least one pair of their longitudinal edges are aligned, then welding the aligned longitudinal edges of the superimposed substrate sheets together to form a multi-substrate open-tubular web and then unfolding the open-tubular multi-substrate sheet web.

30. The method of Claim 29, wherein the welded portions of the unfolded web are flattened to produce a multi-substrate sheet web with a similar thickness throughout,

then folding the outer longitudinal marginal portions of the multi-substrate web over the central portion of the multi-substrate web so that the confronting edges of the folded over portions of the web do not overlap to form an open tubular web which is then cut into strips and the strips laminated to form same panel.

31. The method of Claim 20, wherein the lamination of the tubular segments or strips includes the steps of applying longitudinally extending, laterally-spaced bands of adhesive to portions of the web which are to form one of the top and bottom wall portions of a tubular section of the panel when the tubular portions of the panel extend horizontally and are in vertically spaced relation, and pressing the adhesive-coated side of each of the segments of the web before or after severance therefrom against the side of the adjacent segment of the web which forms or is to form an adjacent tubular section of the panel.

32. The method of Claim 19, wherein there are provided one wide continuous opaque substrate sheet and two narrower continuous light-passing substrate sheets; the securing of the continuous substrate sheets together includes superimposing the three continuous substrate sheets so that the wider opaque substrate sheet is in the middle of the superimposed stack of sheets, and one of the longitudinal margins of the opaque substrate sheet and that one of the light-passing sheets are in alignment and the opposite longitudinal margin of the opaque substrate sheets and the corresponding longitudinal outer margin of the other light-passing substrate sheet are in alignment welding the aligned margins of the superimposed opaque and light-passing substrate sheets together to form a three-substrate web and unfolding the originally superimposed sheets where all of the substrate sheets are in the same plane;

folding the outer light-passing substrate sheets over the opaque central substrate sheet to form an open tubular web;

and then laminating together the longitudinally-spaced segments of the tubular web, severed or to be severed therefrom, so that when the resulting panel is oriented so that the tubular sections thereof extend horizontally and are vertically-spaced relation, when the tubular sections are expanded, the light-passing substrate sheets will form the front and rear wall portions of an expanded tubular section of the panel and the opaque substrate sheets form a common top and bottom wall portion of extended tubular section of the panel, and the light-passing substrate sheet on one side of the panel be shiftable relative to the light-passing substrate sheets on the opposite side thereof so that the opaque central substrate sheet of each tubular section of the panel can be shifted between a position where light can pass freely through the panel to where the opaque substrate sheets overlap one another to obstruct the passage of light through the panel.

33. The method of Claim 32, wherein the lamination includes the steps of applying adhesive to the faces of the inturned marginal portions of the web which are to confront the opaque substrate sheet in the completed panel, and pressing the adhesive-coated side of each of the segments before or after they are severed from the web against the side of the adjacent segment are to form the adjacent tubular sections of the completed panel.

34. The method of Claim 19, wherein there are provided one relatively wide continuous opaque substrate sheet and two narrower continuous light-passing substrate sheets; the securing of the continuous substrate sheets together include superimposing the three continuous substrate sheets so that the wider opaque sheet is in the middle of the superimposed stack of sheets, one of the longitudinal margins of the opaque substrate sheet and that of one of

the light-passing sheets are in alignment and the opposite longitudinal margin of the opaque substrate sheet and the corresponding longitudinal margin of the other light-passing substrate sheet are in alignment, welding the aligned margins of the superimposed opaque and light-passing substrate sheets together to form a three-substrate web;

the method further including the step of unfolding the superimposed welded substrate sheets to form a flat unfolded web, cutting the flat web into strips and laminating the cut strips together by sequentially laterally shifting the strips from their original longitudinally-spaced position and with their cut margins in alignment and sequentially laminating them together in the same order in which they were cut from the web, and then adhering each laterally-shifted cut strip to the strip cut immediately before it, so that the outer longitudinal margin of one of the outermost light-passing substrate sheets of each strip is adhered to the strip just previously cut from the web at the innermost longitudinal margin of the corresponding substrate sheet thereof, and the inner longitudinal margin of the other outermost light-passing substrate sheet of each former strip is adhered to the latter adjacent strip at the outer longitudinal margin of the corresponding outer substrate sheet thereof, wherein when the resulting panel is oriented so that the tubular sections thereof extend horizontally in a vertically-spaced relation and the panel is expanded, one of the light-passing substrate sheets of each laminated segment of the panel forms the front wall portion of one of the cells of the panel, the opposite light-passing substrate sheets of that laminated segment will form the rear wall portion of the adjacent cell of the panel, and the opaque substrate sheet of that laminated segment will form a common wall between two adjacent cells of the panel.

35. The method of Claim 34, wherein the lamination includes the steps of applying bands of adhesive to

longitudinally-spaced segments of the three-substrate web along longitudinal bands where the strips are adhered together at the point described.

36. The method of Claim 20 or 29, wherein the securing of the continuous substrate sheets together is carried out by welding of their longitudinal margins together with sonic welders comprising a vibrating member which presses the substrate sheets to be welded together against an anvil having a pointed profile, so that the substrate sheets being welded are severed at the location of the points on the profile of the anvil, producing a separated, selvedged strip on the side of the pointed profile adjacent the margin of the substrate sheets and welds together confronting marginal portions at the superimposed surfaces of the substrate sheets on the opposite side of the pointed profile of the anvil.

37. The method of Claim 36, wherein there is provided the step of flattening the welds at the longitudinal margins of the three-substrate sheets before the segments of the web before or after they are severed from the web are laminated to the other segments thereof.

38. Apparatus for mass-producing cellular panels for covering windows and the like, the panels comprising a number of elongated tubular sections of thermoplastic, flexible sheet material laminated together to provide a panel comprising many elongated aligned cells, the apparatus comprising:

first means for feeding along a given path two continuous substrate sheets of different appearance which are to form the visible front and rear sides of the panel;

means along the path for securing together at least a pair of continuous flexible substrate sheets along at least one of their adjacent longitudinal edges as the sheets are moved thereby and, if necessary, performing other steps to form a tubular web where the opposite sides thereof are formed by the two continuous substrate sheets; and

located along the path means for cutting equal length segments of the tubular web into tubular strips and laminating the segments together to form the cellular panel when the two substrate sheets form the opposite visible sides of the panel.

39. The method of Claim 19 wherein the securing step is the welding of the longitudinal margin of the substrate sheets together.

40. The method of Claim 39 wherein prior to the lamination of the web segments, the tubular web is flattened and oriented so the welded longitudinal margins of the tubular web are on the top or bottom of the flattened tubular web, and the flattened side margins of the tubular web are formed into a permanent sharp fold by passing the web between a cylindrical anvil which has a central slot which confronts the central portion of the web including the welded margin of the substrate sheets, and a sonic horn engaging and pressing the longitudinal side margins of the flattened web against the cylindrical anvil.

41. An apparatus for mass-producing cellular panels comprising a plurality of parallel, aligned, elongated tubular sections secured together at the median regions of their adjacent longitudinal margins to form the panel, each of the tubular sections being made of flexible thermoplastic sheet material to enable each tubular section to be flattened or expanded into an open cellular tube, the apparatus comprising:

first means for feeding to a welding station at least two continuous thermoplastic substrate sheets of different appearance which are to form the visible front and rear sides of the panel;

a welding station including welding means for heat welding together the continuous thermoplastic substrate sheets fed to the welding station by the first means, along at least one of their adjacent longitudinal margins and where necessary, performing other operations to form a tubular web; and

means for cutting equal length segments of the tubular web into tubular strips and laminating together the segments to form the panel.

42. The apparatus of Claim 41, wherein the first means includes means for superimposing a pair of the continuous substrate sheets which are made of the same width and aligning their superimposed longitudinal margins;

the welding means including means for welding the opposite longitudinal margins of the substrate sheets together to form a flattened tubular web;

and there is provided web-reforming means for opening the flattened tubular web and reflattening the same in a substantially different plane so that the welded together longitudinal margins of the substrate sheets are now in the middle region of the flat opposite sides of the reformed web;

the laminating means laminating the middle regions of the latter opposite flat sides of the reformed web together, so that the welded margins of the

longitudinally spaced substrate sheets which are later hidden from view in the completed panel.

43. The apparatus of Claim 42, wherein there is provided means for flattening the welded portions of the reformed tubular web before to produce a tubular web of similar thickness throughout.

44. The apparatus of Claim 42 or 43, wherein there is provided means for heating the welded portions of the tubular strip to relieve stresses in the reformed tubular web.

45. The apparatus of Claim 42, wherein the web-reforming means includes means providing a slot dimensioned to receive the original flat tubular web and to direct the welded margins of the substrate sheets of the web in a given plane before the initially formed tubular web is opened to direct a first one of the welded margins of the substrate sheets on one side of a third plane, which is a reference plane, and to direct the other welded margins of the substrate sheets of the original web to the opposite side of the reference plane before the initially formed tubular web is opened;

a guiding insert adapted to pass and float within the opened initially formed web, the guiding insert having a pair of pointed projections in the reference plane which engage the open web to expand the same in the reference plane and to keep the two different welded margins of the web on opposite sides of the reference plane;

and means for receiving the guided web with the welded margins directed on opposite sides of the reference plane and flattening the web so that the directed welded margins of the web are on opposite flat sides of the finally flattened reformed tubular web.

46. The apparatus of Claim 45, wherein there is provided a pair of outer guide members having grooves which

confront and overlap in spaced relation the pointed projections of the guide members and dimensioned to receive between them and the pointed projections the opened tubular web.

47. The apparatus of Claim 44, wherein the heating means further includes a heated cambered plate over which the reformed tubular web is pulled.

48. An apparatus for mass producing insulating panels for covering windows and the like, each panel comprising a number of elongated tubular sections of substrate sheet material laminated together to provide a panel comprising many elongated aligned cells, each of the elongated cells, when expanded and extending horizontally and in vertically-spaced expanded relation, being formed by top and bottom wall portions and front and rear wall portions connecting with the front and rear margins of the upper and lower wall portions of each cell, the improvement where the apparatus comprises:

substrate sheet positioning and feeding apparatus described to receive at least two continuous substrate sheets made of differently appearing materials and conveying them along a given path;

substrate sheet securing apparatus along the path positioned to receive the longitudinal margins of the two continuous substrate sheets and to permanently connect the margins together to form a continuous tubular web;

web cutting and laminating apparatus along longitudinally spaced positions to permanently connect longitudinally spaced tubular segments of the tubular web severed or to be severed therefrom, to form secured together tubular strips forming the laminated tubular sections of the panel when severed from the web, and to sever the segments of the web to form the panel of laminated segments; and

web positioning apparatus for positioning the web before the tubular sections are secured together so that the front side of the completed panel is comprised only of one of the substrate sheets having the same appearance and the rear side of the panel is comprised only of the other of the substrate sheets having a different appearance and the permanently connected margins of the tubular sections are in the laminated regions thereof where the margins are hidden from view.

49. The apparatus of Claim 48, wherein the web positioning apparatus includes substrate sheet

superimposing apparatus to superimpose only a pair of the continuous substrate sheets of the differently appearing material, the substrate sheets being thereby initially superimposed so that their opposite longitudinal edges are aligned; and the securing apparatus is positioned to be located along both of the opposite longitudinal edges of the superimposed substrate sheets to connect them together to form a flat closed tubular web; and there is provided web-reforming apparatus positioned to receive therearound the tubular web to open the same and including outer guide members to be positioned outside the expanded tubular web to re-flatten the same in a second plane at a substantial angle to the plane of the original flat tubular web, so that the secured-together edges of the substrate sheets of each strip cut from the web will be located on one of the top or bottom wall portions of a tubular section of the panel when the various strips cut from the web are laminated together and the panel formed thereby is oriented so that the tubular sections thereof extend longitudinally and in vertically-spaced relation.

50. The apparatus of Claim 49, wherein the guide members are positioned to re-flatten the tubular web in the second plane which is less than 90° from the original plane, so that when the flattening step is completed, the points of the tubular section of the panel are secured together and are laterally spaced from each other on the top and bottom wall portions thereof.

51. The apparatus of Claim 48, wherein the laminating apparatus includes adhesive application apparatus along the path which deposits adhesive on the tubular web segments, so that the tubular sections of the panel are adhesively laminated together over the permanently connected margins to reinforce the same.

52. The apparatus of Claim 48, wherein the securing apparatus is apparatus for welding the longitudinal

margins of a pair of the substrate sheets made of thermoplastic material together.

53. The apparatus of Claim 52, wherein there is provided along the path following the welding apparatus, weld-flattening apparatus to reduce bulges which result from the welding operation.

54. The apparatus of Claim 53, wherein web heating apparatus is positioned along the path following the welding apparatus to heat the web to relieve stresses therein and ripples at the welded edges of the substrate sheets.

55. The apparatus of Claim 54, wherein the heating apparatus is an outwardly bowed heated plate over which the web is pulled under tension.

56. The apparatus of Claim 49, wherein the web-reforming apparatus includes a pair of spaced insert members positioned to be located inside and to expand the tube, and either guide members positioned to be outside the expanded tube to confront the insert members to keep the welded portions in laterally spaced relation when the expanded tube is reflattened.

57. The apparatus of Claim 52 wherein the apparatus includes guide means for superimposing the substrate sheets with the longitudinal margins thereof to be secured in alignment and the welding apparatus is a sonic welding apparatus which includes an ultrasonic horn and an anvil between which the longitudinal portions of the superimposed substrate sheets to be welded are fed, the anvil having a pointed profile which severs the portion of the longitudinal margins to be welded at points beyond the pointed portion thereof to produce a strip of waste material separated from the rest of the superimposed substrate sheets being welded together and which anvil effects with the ultrasonic horn the welding together of

the substrate sheets over a various band at points inside the pointed portion of the pointed anvil.

58. The apparatus of Claim 57 wherein there is provided a sensing means projecting and detecting the presence or absence of a space between the strip of waste material desirably separating from the superimposed substrate sheets and the portions thereof being welded together, the sensing means being operable to effect stoppage of the substrate sheet feeding apparatus when the sensing means detects the absence of the space indicating an operation failure of the sonic welding apparatus.

59. The apparatus of Claim 58 wherein the sensing means is a member located in the space where the strip of waste material is supposed to separate from the welded substrate sheets, the member being mounted for movement between a normal inoperative position to an operating position by the superimposed substrate sheets when the strip of waste material is not provided by the sonic welding apparatus.